

CLAIMS

What is claimed is:

1. A flapper valve closing device for moving a flapper valve member into a closed position
5 and retaining it in the closed position under normal operating conditions, the flapper valve member disposed in a valve housing and being useful in an underground oilfield tubular, the valve housing having a bore, the flapper valve member being hingeably moveable between at least one open and at least one closed position relative to the bore, the flapper valve closing device comprising:
10 an elastically deformable member extending at least partially around the circumference of the bore and disposed at least partially in a cavity formed in the valve housing, said elastically deformable member being elongated, having first and second ends and being connected with the valve housing at its first and second ends and with the flapper valve member therebetween, whereby said elastically deformable member is torsionally loaded to provide biasing, closing
15 force upon the flapper valve member to move the flapper valve member into a closed position and retain the flapper valve member in the closed position during normal operating conditions.
2. The flapper valve closing device of claim 1 further including a pivotable arm assembly having an arm engageable with the flapper valve member and at least one rotatable hinge pin,
20 said elastically deformable member being connected with said pivotable arm assembly.
3. The flapper valve closing device of claim 1 wherein said elastically deformable member is non-helical.

4. The flapper valve closing device of claim 3 wherein said elastically deformable member is non-rigidly connected with the valve housing.

5 5. The flapper valve closing device of claim 4 wherein said elastically deformable member has a generally elliptical cross-section.

6. A method of moving a shiftable valve member of a subsurface safety valve into a closed position with the use of a valve closing device, the shiftable valve member being disposed in a housing having a bore, the valve closing device including at least one elongated elastically deformable member disposed at least partially around the circumference of the bore, being connected with the shiftable valve member at one location and with the housing at at least one other location, the shiftable valve member being opened with the use of a valve opening device, the method comprising:

15 actuating the valve opening device to move the shiftable valve member out of a closed position and cause the at least one elongated elastically deformable member to twist,

releasing the valve opening device, and

the at least one elongated elastically deformable member attempting to untwist, applying biasing force to the shiftable valve member to move it into a closed position and retain it in the closed position.